SANTA CLARA VALLEY WATER DISTRICT

PLANNING STUDY

EAST FLOOD CONTROL ZONE

August 1974

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E-1

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Honorable Board of Directors
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, California 95118

Gentlemen:

Transmitted herewith is an Engineer's Report proposed as a revision to the Engineer's Report on the East Zone Flood Control projects presented to you in October, 1973. Following extensive review and a number of public hearings, I recommend that the proposed October, 1973 Engineer's Report not be finalized and adopted in its present form but rather that this more general report and Environmental Impact Report be favorably considered. These documents address whether or not flood protection should be provided at all on any, some or all of the East Zone streams and whether or not a general plan of ways to handle flooding problems should be adopted with more detailed project planning to follow on a priority basis. The findings of this report are made on the basis of considerations set forth in it and the accompanying Environmental Impact Report and are as follows:

1. The District should continue to work towards providing protection against dangerous and socioeconomically damaging flooding potentials in urbanized areas of the East Zone. The District's responsibility will not be completely discharged without providing the means for an informed community to vote to provide enhanced financing in the foreseeable future, for protection works for the most critical areas. Either a general

obligation bond or a tax increase election are appropriate vehicles for such an expression.

2. The District should reformulate a set of plans for future treatment of streams in the East Zone. These plans are vital to the ongoing land use review and permit activity of the cities. The plans would be formulated in consultation with citizens groups within the community most affected by the stream.

I recommend adoption of the findings of this Engineer's Report and certification of the accompanying Environmental Impact Report.

Sincerely,

John T. O'Halloran
General Manager

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INTRODUCTION

Flooding problems in the East Zone of Santa Clara Valley Water District (hereinafter referred to as East Zone) have occurred on a rather frequent basis over recorded history. Recently, major floods have occurred in 1952, 1955, 1958, 1967 and 1969. The needed flood control improvements have been slow in coming due to a shortage of funds, although the flood damage potential continues to increase with urban development in the floodplains.

The East Zone is one of the five flood control zones within Santa Clara Valley Water District (Plate 1). Each zone is a separate financial entity with all local cost for flood control measures being borne by the zone for which the project is located. The area in the East Zone subject to flooding from the one percent flood is about 26,000 acres, with about 26 percent of this area presently in a type of development which has a high flood damage potential. Compared to other zones of the District the flood hazard situation is greater in the East Zone and also the funds collected to resolve this problem are relatively low. These funds are based on the assessed valuation of the property and improvements in the East Zone. This valuation is somewhat lower because of the flood hazard. The present East Zone income is $1,611,000 per year and at today's cost, it would take in excess of 30 years to accomplish the desired flood protection.

The East Zone consists of 354 square miles drained by Coyote Creek. Twenty-six of the many streams in this zone are below Anderson Dam and are presently considered to be flood control projects. Most of the potential flood damage can be attributed to 18 of these streams. The eight other streams either presently have or will have in the near future, adequate flood flow carrying capacity.

In much of the Silver Creek watershed, (one of the 18 streams) early urban development occurred without adequate flood protection. In many cases this development occurred prior to centralized knowledge of potential flood hazards. This early lack of consideration of the flood problem was followed by interim flood control measures being provided by the urban developers with the understanding that the District would provide the one percent flood protection when funds were available. The logic of such action was that the high risk of flooding would only be for a short time. A recent method has been for developers to protect their sites by constructing the flood control measures to the one percent flood level.

Berryessa Creek, another of the 18 streams, is a major watercourse which flows through the City of Milpitas. Within the floodplain area of Berryessa Creek, industrial, residental and towncenter developments have been limited until the flooding problem is resolved. This decision has affected the desires of Milpitas to have a balanced community and corresponding tax base. Other streams in the East Zone have had a similar history of development of a flood potential problem.

In the early 1970's the Board of Directors considered raising the tax rate to accelerate the program of resolving the flood hazard condition in the zone. This method of financing now requires a vote of the people (S.B. 90). Another alternative method of financing considered by the Board of Directors was a general obligation bond. Again this requires an approval by the voters in the zone. Steps were taken to prepare for a bond issue to help finance some of the more critical flood problems. These steps included (1) preparation of a planning study showing detailed methods of flood protection and cost of such protection measures. These studies were also to be used to guide City and County land use planning toward development of a plan of sound land use management and, (2) the preparation of an EIR to discuss the impacts of such proposals. These reports which were completed in October 1973, address all 18 streams in the East Zone which were determined to be the source of the flood problem. In many cases the proposed measures were based on least cost and also the proposed measures were confined to existing rights of way.

During the period of extensive public review of the October 1973 Planning Report and companion EIR it became apparent that study of some more over riding considerations needed to be made before detailed project planning was undertaken.

The public review of the reports revealed a desire on the part of some to limit growth by withholding flood protection. Another concern expressed was that the least cost alternatives and the constraint of confining the flood control measure to the existing right of way in some cases was not always compatible with desires for maximum preservation of natural stream features.

These desires result in our present evaluation of the questions posed and the recommendation that the problems and solution be treated in more incremental steps. In general this report and the companion EIR will present an overview of the total project area, its flood problem, and the direct and indirect impacts of solving or not solving the problem. We will also introduce in a general way the alternative methods of solving the flood problem and discuss their impacts. We then propose to follow with detailed studies on a stream by stream basis utilizing one or a combination of the methods discussed in this report. These detailed studies will be developed with extensive public involvement so as to properly assess the desires of the community. Supplemental EIR's will be prepared to complement the detailed studies of each stream.

ASSESSMENT OF FLOOD POTENTIAL

The East Zone has been subject to extensive flooding in the past. It is also one of the fastest growing areas in the county. During the period of 1960 and 1970, the population in the East Zone planning areas increased from 253,000 to 887,000 and the number of housing units increased from 80,700 to 134,000. About 42 percent of dwelling units constructed in the County during the period 1970 to 1972, were located in this zone. Thus potential flood hazard in the area has been increasing at a rapid pace. Development policies recently followed by the cities in the area would indicate that this trend of increasing the flood hazard will slow down due to more restricted building requirements. Plate 2 shows the extent of historical flooding.

Plate 2 also illustrates those parts of the East Zone which may be flooded by a flood that has a one percent chance of happening in any year. The present (1973) fair market value of the properties subject to one percent flood has been estimated to be 720 million dollars. The one percent flood is the selected design flood of the District. The following paragraph describes many important points needed for a proper understanding of the design flood.

The one percent flood is that flow of water from a drainage area that has a one percent chance (probability of 0.01) of occurring in any given year. It is equivalent to the so-called 100-year flood, but it should not be thought of as an event that occurs regularly every 100th year. Instead, it is the flood flow event that would be equaled or exceeded about 100 times in 10,000 years. It is also possible that two repetitions of this flood flow could occur in a single year, or that a single event may not occur even once in 200 years.

The "one percent flood" is the preferred description of the design flood. However, the term "100-year flood" is equivalent. Unfortunately, this latter term often leads to the misconception that the design flood occurs only every 100th year.

Another terminology problem is the relation of the one percent storm and the one percent flood. The storm magnitude relates to flood magnitude through a complex set of parameters such as antecedent rainfall conditions, drainage basin shape, length, slope, orientation and others. Therefore, a one percent storm will not necessarily produce a one percent flood. The one percent flood should not be confused with nor should it be referred to as the one percent storm flood.

The one percent flood has a small risk of occurrence in a given year, but this risk is accumulative. When compared with the 30-year life of the average home loan, for example, the chance that it will occur is quite large. During the 30-year loan period, the chance that a one percent flood will occur, or be exceeded, approaches 30 percent.

The magnitude of the one percent flood must be calculated using statistical hydrological (stochastic)methods. Since it is the desire of the District to provide equal protection from flooding to all residents, a uniform method of determining design flood flows is required; one that is regional in scope and one that minimizes the chance of providing unequal protection from one area to another. This objective is reached through a regional peak flood frequency analysis that uses the best available hydrologic data from stream systems in and adjacent to the District. The regional process utilized by the District was developed after considerable effort and has been reviewed and approved by the academic and professional community.

The research on the statistical measurement of flood flows and frequencies has shown that the larger magnitude floods that occur at relatively infrequent intervals, such as the one percent flood, are products of extremely heavy rainfalls, either exceptionally high intensity or of long duration. With exceptionally high-intensity rainfall, so much rain falls in a short period of time that no matter what the ground cover is - soil, pavement, grass, trees, or buildings - the water cannot be stored or soaked up, and it runs off in a flood. With long-duration rainfall, a lot of rain falls, but it comes over a long period of time. Bare soil, grassland, forests, landscaping, house roofs, and pavement become fully saturated, and flooding occurs when no more water can be absorbed, stored, or evaporated.

Thus, for large floods, the type of development or degree of urbanization that exists in the watershed is of little consequence.

However, the situation is different for the small magnitude floods which occur at frequent intervals. In these, the rainfall intensity is less or of shorter duration. The absorption, holding, or storage characteristics of the land are much more important. With much less water present, soil, grass, and forests tend to soak up and hold back the rain that falls, while pavement and house roofs let a large percentage run off.

Therefore, when grassland is converted to pavement, the amount of water that runs off is much greater for the small amounts of rainfall. The magnitude of the small, more frequent type of flow is increased by urbanization.

In discussing flood flows and urbanization, there is one additional factor that should be mentioned. This is overbank storage in floodplain areas. Where urbanization occurs in the floodplain and the stream is channelized, the storage of overbank floodwaters is reduced. This results in greater downstream flood flows. This increase in flood flows occurs for any magnitude or frequency of flooding that would have resulted in channel overflow and storage waters in the floodplain.

The flood hazard areas shown on Plate 2 includes all of the areas that have flooded in recorded history plus additional areas that are subject to flooding. Some of the additional areas are also highly urbanized and the flood damage potential is great. Other areas are presently in land uses which if inundated by flood waters would not sustain much damage. Many of these, though, are planned for urbanization as reflected in adopted land use plan of the cities of San Jose, Milpitas, Morgan Hill and the County of Santa Clara; thus if no flood protection is provided, the flood damage would increase greatly.

EVALUATION OF REASONS FOR DISTRICT WORKING TOWARD FLOOD PROTECTION

One step in evaluating the pros and cons of the District working toward a flood protection program in the East Zone is to understand what would happen if a program of not providing flood protection is adopted.

Under this concept, no general plan would be adoped by the District, this implies that no capital improvements (flood control measures) would be made by the District. In general, the threat of flooding from the 100-year design flood would remain about the same or worse for the estimated 91,000 residents of floodable areas. The threat of flooding from lesser floods would also still be present.

Even if the District discontinued its role of providing flood protection, it appears likely that floodable areas within the East Zone would be allowed to develop and some forms of flood protection would continue to be made. In most cases the cities and the county would require the developer to construct piecemeal flood protection measures and would look to District staff for recommendations. In the absence of community reviewed and officially adopted general plans, the requested advice would need to be generated on an uncoordinated and, in some cases, quickly conceived basis. The District would probably still be asked to accept the right of way and maintenance responsibility of these flood control channels constructed by developers. Thus, the results of the "do nothing" alternative would probably be implementation of unadopted flood protection measures over a long period in presently undeveloped and floodable areas. The presently urbanized areas would continue to flood and in fact would be exposed to increased runoff and frequency of flooding due to the upstream development.

Even if it could be assumed in the case of the "do nothing" approach that implementation of all flood protection measures would completely stop, and that all development in the flood hazard areas would stop; other direct and indirect impacts, resulting from construction and from induced growth would continue. The reason this is so is that it appears unlikely that cognizant agencies would impose such strigent and restrictive regulations as to end development. Indirect, growth-related impacts would therefore continue to occur and urban expansion outside the floodable areas would increase runoff and frequency of flooding within the floodable areas. Because no flood protection would be available, incrementally increasing flooding could be expected.

If development were also allowed in marginal flooding areas, the incremental increase in flooding would be even worse because of the high probability that protective measures such as filling of areas would be undertaken. Again these protection measures would not have been "community planned, environmentally tested, nor adopted by the District as the most desirable flood protection program."

To summarize, the adoption at this time of the concept to provide flood protection in the East Zone and to develop the how to do this on a stream by stream basis is desirable for the following reasons:

1. In the case of a flood protection program being adopted and ultimately implemented, a substantial area within the East Zone will be freed of the existing flood hazard. In many parts of the East Zone the cities involved have indicated that development will proceed as soon as the flood problem is cured. Such development has many negative impacts such as air quality, overloading of schools, traffic and conjection problems associated with greater population. The fact is however, that much development of nonfloodable areas can occur, causing the same negative impacts, and in addition, increase the flood hazard in the already urbanized, floodable areas.

2. Clearly commits the District to investigate the flood problem, develop solutions with full community involvement and implement these solutions as timing requries. The solution of the flood problem on each stream could range from floodplain regulations to floodplain acquisition, to modified floodplain construction, to more structural channel treatments or a combination of these.

3. Allows the opportunity to assess the interrelationships of many streams in the zone which are the source of the flood problem. This is accomplished in this report and the companion EIR thus eliminating the need to evaluate the basin wide indirect impacts during future individual stream studies.

Another factor to consider is that homeowners will be required to purchase flood insurance if they refinance their home after July 1975. This additional cost in many cases can be expected to generate desire for accelerated flood protection program because it can be demonstrated that about 9 or 10 years of such costs would be enough to finance adequate flood protection.

4. Existing, planned, or proposed streamside park chains would have their effectiveness compromised and their economic feasibility reduced if flood protection was not well planned and only implemented in a hit and miss fashion.

CONCLUSION

This report and companion EIR assesses interrelationship of many streams in the zone which are the source of the flood problem. The reports also provide a broad assessment of environmental impacts associated with a decision that flood protection be provided on east zone streams.

Based on the evaluation of the above mentioned factors it is concluded that the District should continue to work toward providing flood protection in the East Zone. To accomplish this objective, this report and companion EIR present a general plan and its impact respectively. Later, project plans on a stream by stream basis for all 18 streams will be produced in accordance with a priority schedule. The solutions of the flood problem on each stream could range from floodplain regulation, to floodplain acquisition, to modified floodplain construction, to more structural treatments or combination of these. The schedule and the detail plans will be developed utilizing community involvement.

Plate 3 shows the 18 streams which are to be studied on an individual basis to determine the most desirable solution to prevent flooding in the East Zone

It is further concluded that the present income is inadequate and needs to be supplemented. This can be accomplished by holding either a successful general obligation bond or tax election. The scope of the bond issue or amount of tax increase should be based on providing funds to immediately resolve the flood hazard in critical flood hazard areas.

It is also concluded that an action program must begin immediately in the critical Silver and Berryessa Creeks flood hazard areas of the zone. To achieve this a 9-year program was developed and endorsed by the cities of San Jose, Milpitas and the land development community in January 1974. To implement this program in a timely fashion this report needs to be adopted. The 9-year schedule was based on a pay-as-you-go financing method with funds to be provided by all parties involved.

Included in the critical program was the Lower Silver Creek Project. Flood control measures on it were to be done in two stages. The first stage would be to enlarge the channel between Cunningham Avenue and Capitol Expresway to convey the maximum flow possible within the existing right of way. The second stage would be to enlarge the entire channel to the one percent flood carrying capacity. The work done in this stage would be based on a plan developed with full community participation. Also, Cunningham Lake would be constructed during this period as well as the reach of Thompson Creek from its confluence with Silver Creek to Aborn Road.

Berryessa and Lower Penitencia Creeks is included in the 9-year program and their inclusion is very critical in terms of resolving the flood hazard condition in the Milpitas area.

Many of the most critical flood hazards have their source of flood water from streams located in an already highly urbanized area. The possibility of recreating a natural stream in these areas is small, but it is believed that a plan developed through a community involvement program will balance the goals and objectives with the practical, physical and economic limitations.

In addition to the critical areas of the East Zone, project planning should commence in yet to be developed areas of the urban service areas of the cities. The priorities of these streams should be established in conjunction with the land use plans of the cities and the goals of the community. At the present time the City of San Jose has a building moratorium in the Evergreen area until a flood prevention program has been established. Implementation of the City of Milpitas industrial area plan has been waiting for the needed flood protection.

One of the 18 streams and parts of others (Fisher Creek and parts of Thompson and Coyote Creeks) are outside of the urban service area in the urban reserve area. Steps should be taken to develop a flood protection program in those areas at this time. If this is done early and in conjunction with land use planning and District-wide goals, potential flood damages in these areas could be prevented. The steps could include floodplain zoning, which has the benefits of preservation of natural streams and limiting development in natural floodplains.

ALTERNATIVE ACTIONS POSSIBLE WITHIN FRAMEWORK OF "CONCLUSIONS"

The proposal includes developing plans based on community involvement on a stream by stream basis. During these studies, alternatives of how to provide flood protection will be investigated. In some cases, leaving the stream and adjacent floodplain natural is a viable alternative, in many cases, it is not. Another alternative would be some form of floodplain regulation. This would require cooperation and involvement including adoption of these regulations by the affected cities and/or County. The combination of stream treatment and floodplain regulation will be investigated.

RESERVOIRS

Upstream reservoir storage is an alternative, but unlike the other alternatives, it generally affects more than one stream. With the exception of reservoir potential on Coyote Creek and Lake Cunningham on Silver Creek, other reservoir alternatives have been investigated and are discussed in detail in the alternative section of the EIR. The findings of that investigation are:

1. The potential sites studied are either located within the Hayward Fault Zone or very close to it making construction of dams a very difficult and questionable possibility.

2. All sites are in steep walled geologically unstable canyons upon which numerous landslides have occurred or which are susceptible to landslides.

3. The drainage area controlled by the potential dams and reservoirs is small, thus the flows from the remaining drainage

areas (assuming they exceeded existing channel capacity), would have to be handled by other measures anyway.

4. In many cases below these sites, the existing stream channels are non-existent or very small, again making other measures necessary anyway.

Considering these findings which show a severe geologic instability and ineffective control of flood waters because of site location, dams and reservoirs for flood control purposes are considered not practical. As stated previously, reservoir sites on Coyote Creek are being investigated by the Corps of Engineers. In addition, Lake Cunningham or Silver Creek will be analysed to determine the flood control potential when the final park design is completed and will be input to the detail study to be performed on Silver Creek.

FLOODPLAIN REGULATIONS

Floodplain regulations include some form of use restriction, such as zoning, building codes, etc., which are applied to flood hazard areas. The areas could continue to be used for purposes compatible with flooding. Acceptable uses would generally be as agriculture, open space or recreation, but this would not necessarily eliminate other uses or development if such developments could be made "flood-proof".

Implementation of a floodplain regulation program is usually more feasible in areas which are currently being used for purposes compatible with flooding. This normally would be in the urban reserve areas or the undeveloped urban service areas. It is difficult to phase out non-compatible uses, such as homes.

In general, the floodplain regulations approach can not be considered as the only method to solve flood problems in extensive floodable areas presently totally or near totally urbanized. It is impractical to believe that all urban uses can or should be phased out in the entire floodplain area of the East Zone. It is, rather, a method which will be considered in combination with some form of channel treatment at the time detail studies are made on individual streams.

On feature of floodplain regulation that must be mentioned is that it is a much less permanent solution than most other alternatives (stream treatment, reservoirs) since a change in the attitude of the political body can release the regulations very quickly. This could follow election of new members with different goals and objectives for the community.

An important element that also needs to be understood relative to a floodplain regulation program is the role of different public agencies. Floodplain regulations, such as zoning, building restrictions, etc. must be imposed by the affected cities and/or county. This must be imposed by the affected cities and/or the county. This places another group of elected officials into the flood protection act, usually with much less background on the subject and a limited time to gain the needed background. To properly compare this alternative in the community involvement phase of the individual stream planning program, a commitment and endorsement of the concept needs to be obtained from the cities and/or the county.

The Federal Flood Insurance program will have a significant effect upon the long-term flood protection program in the East Zone and should foster the desirable features of floodplain regulation. Once the cities and/or the county qualifies for the program the following happens:

1. Individuals will be able to purchase insurance as a means of mitigating potential flood losses. If new federally assisted loans are desired, these individuals will be required to purchase the insurance.

2. The cities and/or county will adopt land use regulations giving proper consideration to flood hazards during future development. This will include prohibiting development from part of the flood hazard areas and requiring homes to be constructed above the one percent flood level in other parts of the flood hazard area.

The flood insurance program can be considered as a possible alternative to providing flood protection. In some cases, the cost of premiums over the life of the project may exceed the cost of other acceptable alternatives however.

There are areas, primarily on undeveloped lands, where floodplain regulation would result in the reduction of some direct and indirect environmental impacts. In addition, there would be a clearly beneficial effect on scenic and recreational environments in the East Zone. This alternative would make it possible to retain streamside land in public open space, would potentially assist in the realization of city and county streamside recreation and open space plans and would help preserve and enhance the creeks present visual qualities. Areas of riparian habitat would remain undisturbed and in particular, the salt marsh areas with their special-status faunal species might be preserved. Indirect growth related impacts would be reduced, particularly if floodplain zoning were used to the fullest extent possible. Again however, it must be noted that community goals and objectives may opt for providing flood protection instead in certain areas.

STREAM TREATMENT

Flood protection by some form of stream treatment is an alternative that will be considered in detail during the individual stream studies. These various forms of treatments include acquisition of natural floodplain, modified floodplain channels, earth trapezoidal channel, concrete channel, and closed conduits. These alternative streams treatments are dicussed in detail in the EIR.

In summary, reservoirs are not feasible except possibly on Coyote Creek and Silver Creek (Lake Cunningham), but all other alternatives or combination of alternatives will be investigated in depth during the community involved individual stream studies.

SUMMARY

1. The East Zone includes 354 square miles of area in the northeasterly portion of Santa Clara Valley and the adjacent foothills. Much of the total watershed is in the foothill area and lies within the unincorporated area of Santa Clara County. A large portion of the City of San Jose and the entire City of Milpitas lies within the watershed area under study.

2. Extensive historical flooding has occurred in the area.

3. The estimated one percent flood would affect about 91,000 residents and has the potential for substantial flood damage. The present (1973) assessed valuation of properties within the floodable areas is estimated to be $720 million.

4. The District should continue to work towards providing protection against dangerous and socioeconomically damaging flooding potentials in urbanized areas of the East Zone. The District's responsibility will not be completely discharged without providing the means for an informed community to vote to provide enhanced financing in the forseeable future, for protection works for the most critical areas. Either a general obligation bond or a tax increase election are appropriate vehicles for such an expression.

5. The District should immediately begin to reformulate a set of plans for future treatment of streams in the East Zone. These plans are vital to the land use review and Permit activity

of the cities. The plans would be formulated in consultation with citizen groups within the community most affected by the stream.

Submitted by

John L. Richardson
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Design and Construction

Recommend Approval

George Korbay
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Approved

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